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ORIGINAL ARTICLE
Heart Failure

Clinical Characteristics and Social Frailty of Super-Elderly Patients With Heart Failure

— The Kitakawachi Clinical Background and Outcome of Heart Failure Registry —

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Background: Social background is important in preventing admission/readmission of heart failure (HF) patients. However, few clinical studies have been conducted to assess the social background of these patients, especially elderly patients.

Methods and Results: The Kitakawachi Clinical Background and Outcome of Heart Failure (KICKOFF) Registry is a prospective multicenter community-based cohort of HF patients, established in April 2015. We compared the clinical characteristics and social background of the super-elderly group (≥85 years old) and the non-super-elderly group (<85 years old). This study included 647 patients; 11.8% of the super-elderly patients were living alone, 15.6% were living with only a partner, and of these, only 66.7% had the support of other family members. The super-elderly group had less control over their diet and drug therapies than the non-super-elderly group. Most patients in the super-elderly group were registered for long-term care insurance (77.4%); 73.5% of the super-elderly patients could walk independently before admission, but only 55.5% could walk independently at discharge, whereas 94% of the non-super-elderly patients could walk independently before admission and 89.4% could walk independently at discharge.

Conclusions: The KICKOFF Registry provides unique detailed social background information of Japanese patients with HF. Super-elderly patients are at serious risk of social frailty; they need the support of other people and their ability to perform activities of daily living decline when hospitalized.

Key Words: Activities of daily living; Elderly; Heart failure; Japan; Quality of life

Heart failure (HF) is one of the most common diseases in cardiology, because there is a higher prevalence of HF in the elderly and the population is increasingly aging.[1,2] Many studies have described the clinical characteristics and methods of therapy, examination, and prognosis of patients with HF in many countries and communities,[3–6] but most of these studies in Japan have focused on patients with HF hospitalized in university and large urban hospitals.[4–6]

There are few guidelines for clinical decision-making in older patients with cardiovascular disease, and little is known about the effects of diagnostic and therapeutic interventions on key factors that are particularly important to older patients, such as quality of life, physical function, and maintenance of independence.[7] The Tilburg Frailty Indicator, used for the general population, includes the effect of a person's social background; however, an indicator for social frailty in patients with HF has not yet been defined.[8] Social background is increasingly recognized as relevant in preventing the readmission of patients with HF.[9] However, few clinical studies have been conducted to assess detailed information such as the prevalence of social frailty and social influences among patients with HF in

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Table 1. Baseline Clinical Characteristics of the KICKOFF Registry Patients With Heart Failure

	All patients	Super-elderly (>85 years old)	Non-super-elderly (<85 years old)	P value
n	647	212 (32.8)	435 (67.2)	
Male	329 (50.9)	72 (34.0)	257 (59.1)	<0.001
Age (years; mean)	78.2±11.5	89.8±3.7	72.5±9.7	<0.001
BMI (kg/m²)	21.8±4.9	20.4±3.9	22.5±4.2	<0.001
On admission				
Systolic BP (mmHg)	143.3±34.1	144.6±32.1	142.7±35.1	0.507
Diastolic BP (mmHg)	82.7±23.4	78.7±21.7	84.7±24.0	0.002
Heart rate (beats/min)	91.9±29.8	87.4±29.8	94.0±29.6	0.008
At discharge				
Systolic BP (mmHg)	113.0±20.7	113.5±22.1	112.7±19.9	0.663
Diastolic BP (mmHg)	63.7±14.2	61.6±14.5	64.8±14.0	0.007
Heart rate (beats/min)	74.1±17.0	74.9±18.2	73.7±16.4	0.430
Previous hospitalization for HF	232 (35.9)	80 (37.7)	152 (34.9)	0.055
Outcome of discharge				
Own home	478 (73.9)	110 (51.9)	368 (84.6)	<0.001
Institution for the aged	62 (9.6)	49 (23.1)	13 (3.0)	<0.001
Other hospital	35 (5.4)	18 (8.5)	17 (3.9)	0.019
In-hospital death	72 (11.1)	35 (16.5)	37 (8.5)	0.003
Length of hospital stay (days)	25.4±21.4	27.9±22.9	24.2±20.6	0.037
Comorbidities				
History of heart failure	367 (56.7)	120 (56.6)	247 (56.8)	0.966
Coronary artery disease	197 (30.5)	50 (23.6)	147 (33.8)	0.007
Valvular disease	205 (31.7)	83 (39.2)	122 (28.1)	0.005
Cardiomyopathy	94 (14.5)	15 (7.1)	79 (18.2)	<0.001
Hypertension	442 (68.3)	152 (71.7)	290 (66.7)	0.194
Diabetes mellitus	206 (31.8)	38 (17.9)	168 (38.6)	<0.001
Dyslipidemia	232 (35.9)	49 (23.1)	183 (42.1)	<0.001
Atrial fibrillation	280 (43.2)	102 (48.1)	178 (40.9)	0.084
Chronic kidney disease	355 (54.9)	125 (59.0)	230 (52.9)	0.143
Chronic obstructive pulmonary disease	113 (17.5)	43 (20.3)	70 (16.1)	0.343
Device implantation	53 (8.2)	22 (10.4)	31 (7.1)	0.164
Dementia	207 (32.0)	124 (58.5)	83 (19.1)	<0.001
Active malignancy	28 (4.3)	11 (5.2)	17 (3.9)	0.459

Categorical data are presented as number (%). Continuous data are presented as mean±standard deviation. BMI, body mass index; BP, blood pressure; KICKOFF, Kitakawachi Clinical Background and Outcome of Heart Failure.

Japan, and identification of these social factors and assessment of their role might be of great importance for the development of multidimensional models and for the comprehensive management of frail individuals.[10] In addition, preceding studies have not comprehensively examined the clinical characteristics and social backgrounds of super-elderly patients aged ≥85 years.

The Kitakawachi Clinical Background and Outcome of Heart Failure (KICKOFF) Registry is a prospective multicenter community-based cohort of patients with HF in Japan, established in April 2015. This study aimed to identify the clinical characteristics, management, social background, and outcomes of hospitalized super-elderly patients with HF.

Methods

Study Cohort

The inclusion criterion for the registry was a diagnosis of HF during hospitalization. The diagnosis of HF was confirmed by the presence of at least 2 major criteria or 1 major criterion in conjunction with 2 minor criteria according to the Framingham criteria.[11] There were no exclusion criteria. The detailed study design, patient enrollment, and definition of the measurements of the KICKOFF Registry are also described in the UMIN Clinical Trials Registry (UMIN000016850). The study institutions included 13 hospitals in the north of Kitakawachi (Hirakata-shi, Neyagawa-shi and Katano-shi) and Yawata. Kitakawachi is located at the eastern end of Osaka Prefecture and Yawata is located at the southern end of Kyoto Prefecture. The northern parts of Kitakawachi and Yawata, with a total population of 798,000, are typical satellite communities in Japan. The participating institutions consisted of 1 cardiovascular center and 12 small- and medium-sized hospitals (<450 beds for acute care), serving as primary and secondary referral medical centers.

The clinical data of the patients were uploaded to an internet database system (http://www.kickoff-registry.com) by the physicians in charge at each institution. Data were

Table 2. Background Characteristics of the KICKOFF Registry Patients With Heart Failure

	All patients	Super-elderly (>85 years old)	Non-super-elderly (<85 years old)	P value
n	647	212	435	
Life style				
Alone	189 (29.2)	25 (11.8)	164 (37.7)	<0.001
With partner only	112 (17.3)	33 (15.6)	79 (18.2)	0.410
With son or daughter	258 (39.9)	88 (41.5)	170 (39.1)	0.554
Institution for aged or hospital	88 (13.6)	66 (31.1)	22 (5.1)	<0.001
Family support (alone or with partner only)	129 (41.7)	36 (66.7)	93 (42.7)	0.002
Dietary management				
Personal	193 (29.8)	35 (16.5)	158 (36.3)	<0.001
Partner	182 (28.1)	27 (12.7)	155 (35.6)	<0.001
Son or daughter	123 (19.0)	67 (31.6)	56 (12.9)	<0.001
Caretaker	13 (2.0)	7 (3.3)	6 (1.4)	0.114
Institution for aged or hospital	87 (13.4)	64 (30.2)	23 (5.3)	<0.001
Home-delivery service	16 (2.4)	6 (2.8)	10 (2.3)	0.686
Dining out	33 (5.1)	6 (2.8)	27 (6.2)	0.054
Drug therapy management				
Personal	429 (66.3)	80 (37.7)	349 (80.2)	<0.001
Partner	56 (8.7)	16 (7.6)	40 (9.2)	0.479
Son or daughter	73 (11.3)	48 (22.6)	25 (5.8)	<0.001
Caretaker	8 (1.2)	8 (3.8)	0 (0.0)	<0.001
Institution for aged or hospital	81 (12.5)	60 (28.3)	21 (4.8)	<0.001
Exercise habit				
>3 times per week	130 (20.1)	24 (11.3)	106 (24.4)	<0.001
2 times per week	47 (7.3)	15 (7.1)	32 (7.4)	0.897
None	470 (72.6)	173 (81.6)	297 (68.3)	<0.001
Occupation	86 (13.2)	1 (0.5)	85 (19.5)	<0.001
Long-term care insurance	293 (45.3)	164 (77.4)	129 (29.7)	<0.001
Support required 1 (e.g., standing on 1 foot)	30 (10.5)	8 (5.0)	22 (17.3)	<0.001
Support required 2 (e.g., walking; possibly improved)	48 (16.7)	27 (16.9)	21 (16.5)	0.939
Care level 1 (e.g., walking; maintained)	35 (12.2)	17 (10.6)	18 (14.2)	0.363
Care level 2 (e.g., moving, wear/pull off trousers)	76 (26.5)	49 (30.6)	27 (21.3)	0.072
Care level 3 (e.g., washing face, oral care)	50 (17.4)	25 (15.6)	25 (19.7)	0.369
Care level 4 (e.g., dietary intake, communication)	23 (8.0)	15 (9.4)	8 (6.3)	0.336
Care level 5 (e.g., swallowing, memorization)	19 (6.6)	15 (9.4)	4 (3.2)	0.029
Unknown	6 (2.1)	4 (2.5)	2 (1.6)	0.582
Home-visit medical service	47 (7.3)	27 (12.7)	20 (4.6)	<0.001
Day service or day-care	109 (16.9)	63 (29.7)	46 (10.6)	<0.001

Categorical data are presented as number (%). KICKOFF, Kitakawachi Clinical Background and Outcome of Heart Failure.

automatically checked for missing or contradictory entries and values out of the normal ranges. Additional editing checks were performed at the general office of the registry.

Data were collected, beginning at the event of hospitalization and ending with the patient's discharge, from medical record review. We recorded the patient's social background history and living situation through interviews with the patient or other family members. Data recorded at discharge included patient's baseline clinical characteristics, HF etiology, discharge prescriptions, blood tests and echocardiography results performed at the time of discharge, social background, and status of activities of daily living (ADL). Japanese had an average life expectancy of 83.7 years in 2015, so we defined the super-elderly group as patients aged ≥85 years. Our definition is consistent with that used in other studies.[12,13] We compared the clinical baseline characteristics and social background of the super-elderly group with those of a non-super-elderly group aged <85 years old.

Patient Data Definitions

History of HF was diagnosed if the patient had a history of hospitalization for HF, or if the patient had symptoms caused by HF (NYHA functional class ≥2). Hypertension was diagnosed if peripheral blood pressure was >140/90 mmHg or if the patient was taking medication for hypertension. The presence of diabetes was diagnosed using HbA1c (JDS) 6.5% as the standard or was assumed if the patient was taking medication for diabetes. Dyslipidemia was diagnosed if total cholesterol was >220 mg/dL, if low-density lipoprotein-cholesterol was >140 mg/dL, if triglycerides were >150 mg/dL, if high-density lipoprotein-cholesterol was <40 mg/dL, or if the patient was taking statin medication. Chronic kidney disease was diagnosed if there was persistent proteinuria or

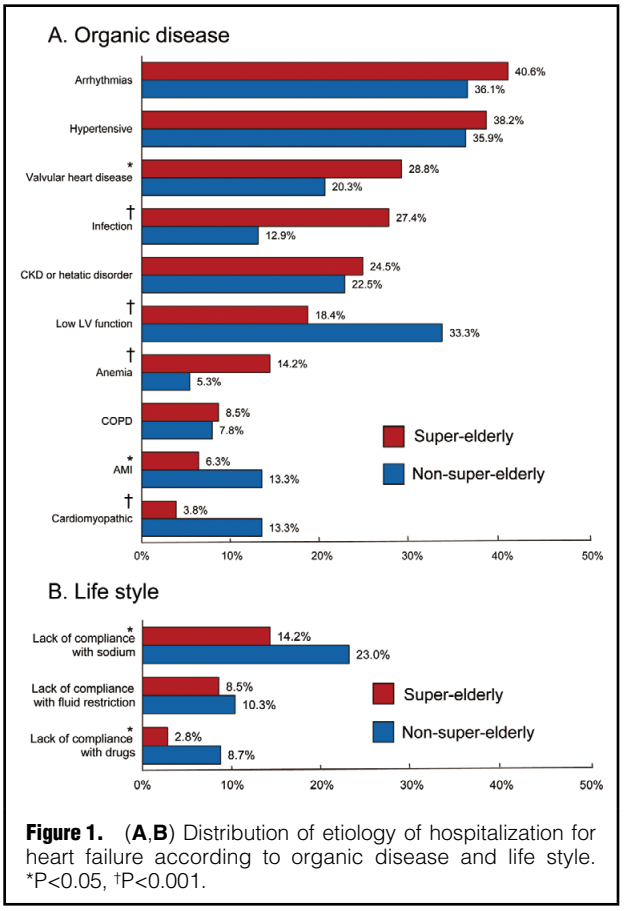

Figure 1. (**A**,**B**) Distribution of etiology of hospitalization for heart failure according to organic disease and life style. *P<0.05, †P<0.001.

if the estimated glomerular filtration rate (eGFR) was <60 mL/min/1.73 m^2 for >3 months. Dementia was diagnosed if it had been previously diagnosed by a physician or based on the criteria of the Ministry of Health, Labour and Welfare of Japan, (i.e., the condition that memory functions and other cognitive functions have become underactive as far as causing disorder with performing ADL because of organic changes of the brain that are caused by any factor).[14] The diagnosis of short-term memory impairment was based on the judgment of the patient's long-term primary care doctor. The physician was allowed to select multiple answers for the etiology of HF from a list of choices. Patients were categorized into 4 types of ADL: (1) independent outdoor walking, (2) independent indoor walking, (3) indoor walking with assistance, or (4) abasia. Long-term care insurance was defined by the Ministry of Health, Labour and Welfare of Japan. Characteristics of each level are shown on the website of the Ministry of Health, Labour and Welfare of Japan.[15]

Patient Confidentiality

The study protocol conformed to the ethical guidelines of the 1975 Declaration of Helsinki, and was approved by the Ethics Committee of the Hirakata Kohsai Hospital. Informed consent was given by each patient or family if the patient had dementia. The registry did not have any protocol-specified alteration of treatment or any other method of outpatient department care. Patient confidentiality was preserved because we did not collect direct patient identifiers, such as name, address, or identification number.

Statistical Analysis

We compared the clinical baseline characteristics and social background of the super-elderly and non-super-elderly groups. Continuous variables are expressed as mean±standard deviation, or median and interquartile range. Categorical variables are presented as numbers and percentages. We compared the categorical variables using the chi-square test when appropriate; otherwise, we used Fisher's exact test. We compared continuous variables using Student's t-test on the basis of the distribution. The paired t-test was used to identify the proportion of ADL before admission and at discharge. During analysis of discharge prescriptions, examination results and ADL before admission and at discharge, we excluded patients who died while in hospital. We used JMP version 9 (SAS Institute, Cary, NC, USA) to perform all analyses. Two-sided P values <0.05 were considered statistically significant.

Results

Baseline Clinical Characteristics of Patients

As of July 2016, we had enrolled 647 patients from 13 institutions. The demographic and baseline clinical characteristics of all registered patients with HF are summarized in **Table 1**: 50.9% were men and their mean age was 78.2 years. A total of 212 (32.8%) patients were super-elderly aged ≥85 years. The super-elderly group had a higher hospital mortality rate and a lower discharge rate than the non-super-elderly group. The super-elderly group was more likely to have dementia. Our study showed that the super-elderly group were less likely to have coronary artery disease, cardiomyopathy, diabetes mellitus, and dyslipidemia.

Social Background

Table 2 shows the social background of the study patients with HF. Of the super-elderly patients who were living alone or with a partner, only 66.7% had the support of other family members. In the super-elderly group, 31.1% were living in an institution for the elderly or in a hospital. The super-elderly group had less control over their diet and drug therapies than the non-super-elderly group. Most patients in the super-elderly group were registered for long-term care insurance (77.4%), but few received day-care services (29.7%) or home-visit medical services (12.7%).

Baseline Etiologies of HF

Figure 1 shows the distribution of the etiologies of HF at admission. Arrhythmias and hypertensive heart disease were predominant in both groups. The super-elderly group was more likely to have valvular heart disease, infection, and anemia than the non-super-elderly group. However, the proportion of patients with cardiac ischemic disease or cardiomyopathic heart disease was lower in the super-elderly group than in the non-super-elderly group. The patient's lack of compliance with the required sodium intake was the predominant cause for this in both groups. The super-elderly group was less likely to have the cause of lack of compliance with required sodium intake or other prescribed drug treatments.

Prescription and Examination Results at Discharge

Table 3 shows the drugs prescribed and the examination results at discharge among the surviving patients with HF. Angiotensin II receptor blocker was the most commonly used class of antihypertensive drug. Digitalis was only used

Table 3. Discharge Medications and Examinations for KICKOFF Registry Patients With Heart Failure

	All patients	Super-elderly (>85 years old)	Non-super-elderly (<85 years old)	P value
n	575	177	398	
Discharge medications				
Diuretic	472 (82.1)	146 (82.5)	326 (81.9)	0.868
Angiotensin II receptor blocker	276 (48.0)	76 (42.9)	100 (50.3)	0.105
Aldosterone-receptor antagonist	76 (13.2)	23 (13.0)	53 (13.3)	0.295
Calcium-channel blocker	120 (20.9)	37 (20.9)	83 (20.9)	0.989
β-blocker	383 (66.6)	94 (53.1)	289 (72.6)	<0.001
Oral inotropic agent	43 (7.5)	13 (7.3)	30 (7.5)	0.935
Digitalis	29 (5.0)	7 (4.0)	22 (5.5)	0.416
Rate control agent	40 (7.0)	5 (2.8)	35 (8.8)	0.005
Rhythm control agent	49 (8.5)	9 (5.1)	40 (10.1)	0.040
Antiplatelet agent	200 (34.8)	53 (29.9)	147 (36.9)	0.102
Anticoagulant agent	227 (39.5)	60 (33.9)	167 (42.0)	0.066
Antilipidemic agent	144 (25.0)	20 (11.3)	124 (31.2)	<0.001
Blood tests				
Total protein (mg/dL)	6.7±0.7	6.4±0.7	6.8±0.7	<0.001
Albmin (mg/dL)	3.4±0.6	3.2±0.6	3.5±0.5	<0.001
Hemoglobin (g/dL)	11.9±2.2	10.9±1.6	12.3±2.3	<0.001
Creatinine (mg/dL)	1.5±1.6	1.2±0.9	1.6±1.9	0.007
BUN (mg/dL)	26.9±17.1	27.9±14.9	26.4±18.0	0.359
eGFR (mL/min/1.73 m^2)	47.4±23.1	46.6±24.6	47.7±22.4	0.603
BNP (pg/dL)	440.9±565.7	471.7±574.3	427.4±562.1	0.391
HbA1c (JDS) (%)	6.5±1.3	6.2±0.9	6.6±1.4	0.003
Echocardiography				
LV diastolic diameter (mm)	48.6±9.5	43.6±7.6	50.8±9.4	<0.001
LV systolic diameter (mm)	35.7±11.0	30.7±8.5	37.9±11.3	<0.001
LVEF (%)	51.8±17.6	57.0±16.3	49.5±17.7	<0.001
LVEF <50%	261 (45.4)	57 (32.2)	204 (51.3)	<0.001
Local asynergy	216 (38.4)	46 (26.9)	170 (43.4)	<0.001

Categorical data are presented as number (%). Continuous data are presented as mean±standard deviation. We excluded 72 patients with in-hospital death. BNP, brain natriuretic peptide; BUN, blood urea nitrogen; EF, ejection fraction; eGFR, estimated glomerular filtration rate; Hb, hemoglobin; KICKOFF, Kitakawachi Clinical Background and Outcome of Heart Failure; LV, left ventricle.

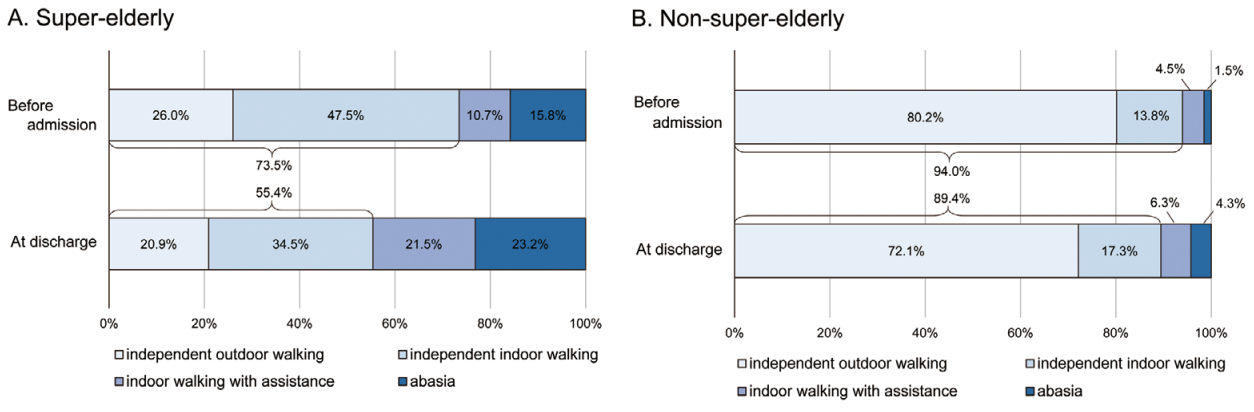

Figure 2. (**A**,**B**) Distribution of walking ability before admission and at discharge in the super-elderly and non-super-elderly groups of patients with heart failure.

in 5% of all patients. The super-elderly group had lower levels of creatinine than the non-super-elderly group, but there was no significant difference in eGFR. Echocardiography was performed in 565 patients. The proportion of patients with reduced ejection fraction (LVEF <50%) was lower in the super-elderly group than the non-super-elderly group.

ADL Before Admission and at Discharge

A total of 575 patients survived to discharge. **Figure 2** shows the distribution of the ADL of the patients with HF before admission and at discharge. Almost three-quarters (73.5%) of super-elderly patients could walk independently before admission, 55.4% could walk independently at discharge (i.e., 18.1% lost the ability to walk independently by the time they were discharged). In contrast, 94% of non-super-elderly patients could walk independently before admission, and 89.4% could walk independently at discharge (i.e., only 4.6% lost the ability to walk independently by the time they were discharged). In addition, the proportion of patients with abasia increased from 15.8% before admission to 23.2% at the time of discharge in the super-elderly group ($P<0.001$); that is, 7.4% of the super-elderly patients became abasic as a result of hospitalization for HF.

Discussion

The KICKOFF Registry provides unique social background information on Japanese patients with HF through the cooperation of small- and medium-sized hospitals in Kitakawachi, Osaka and Yawata, Kyoto, Japan. This is the first report to describe in detail the social background of patient with HF in Japan, especially super-elderly patients, based on a community-based registry. In this study, we enrolled patients with HF who were older than those reported in previous Japanese registries.[4–6] The super-elderly group had more women and lower BMI than the non-super-elderly group, which was consistent with the results from previous studies.[13] In addition, our registry study demonstrated that patients ≥85 years old with HF are at a greater risk of social frailty than those aged <85 years. Our study might help clinical physicians and co-medical staff better understand the social frailty of super-elderly patients with HF.

Social Frailty

The community-based registry in this study enrolled patients with HF who were older than those reported in previous Japanese registries,[4–6] and more than one-third of patients with HF were super-elderly (aged ≥85 years). We found that hypertensive heart disease and arrhythmias were the predominant etiologies of HF in this study. Controlling hypertension is very important in patients with cardiovascular diseases, such as patients with HF. To effectively manage such diseases, it is important for the patient to not only comply with their prescribed medical treatment but to also monitor their daily blood pressure and comply with their required sodium intake. A decline in ADL and cognitive functions might lead to failure in treatment management and compliance with sodium intake in super-elderly patients with HF. Indeed, we found that 11.8% of super-elderly patients were living alone, and 15.6% were living with only a partner. Among those living alone or with a partner, only 66.7% had the support of other family members. In addition, of the super-elderly group who were living alone or with a partner, 19.2% had control over their diet, and 16.5% had control over their own drug therapy; 58.5% of those patients had dementia. Most super-elderly patients were registered for long-term care insurance; however, only a low proportion of these received home-visit medical services. A previous study suggested that poor socioenvironmental situations, such as poor follow-up visiting, no occupation and no professional support, were potentially important predictors of social frailty.[9] Therefore, we need to construct a systematic management system that includes family care, and coordinated care in hospitals and for outpatients, the effective use of home-visit medical services, and day-care and day services; super-elderly patients with HF require a greater level of social support.

Decline in ADL

Hospitalization itself had a worsening effect on performance of ADL, especially by the super-elderly patients. We found that 18.1% of super-elderly patients had changed from independent walking before admission to a decline in ADL by the time of discharge. The rate of decline in ADL was higher in the super-elderly group than in the non-super-elderly group. An increase in cardiovascular risk factors is associated with a decline in instrumental ADL.[16] There are several ways in which this decline in ADL can be explained. First, patients with HF are cardiopulmonary insufficient because of deteriorated systolic, diastolic, or valvular function. Second, super-elderly patients have muscle weakness, and bed rest for treatment and myopathy can further reduce their muscle strength.[17] Intrinsic skeletal muscle abnormalities exist in patients with HF and could limit their tolerance for exercise.[18] We did not collect information on the implementation of cardiac rehabilitation for the patients while in hospital; however, it is important to implement cardiac rehabilitation in the acute phase of a patient's hospital stay and for outpatients to continue the exercise regimen. Third, dementia can be worsened by a change in environment.[19] Thus, we should prevent any decline in the performance of ADL in patients with HF to reduce their rate of hospital readmission.

Etiology of HF

Many previous studies have reported the etiologies of HF. Most studies have demonstrated that ischemic heart disease is the major cause of HF.[4,6] JCARE-GENERAL showed that ischemic heart disease was the predominant cause of HF in patients treated in hospital (Hospital-HF) or in general practice (GP-HF); hypertensive heart disease was more common in the GP-HF group. The GP-HF group were more likely to be female and older than the Hospital-HF group (female proportion: 62% vs. 45%; mean age: 77 vs. 71 years, respectively).[20] Our community-based registry had many super-elderly patients with HF (mean age: 78.2 years old), and our registry was more similar to the GP-HF group than the Hospital-HF group. In the super-elderly patients, the most common etiology of HF was hypertensive heart disease, and therefore, effective management and therapy of hypertensive heart disease is very important to prevent readmission of these patients with HF.[21]

The super-elderly group was less likely to have lack of compliance with prescribed drug treatments. We think the reason is that the super-elderly group had less control over their drug therapies than the non-super-elderly group. Super-elderly patients need the support of their family members, caretakers or institutional staff. Of the non-super-

elderly patients with HF, 80.2% had personal control over their drug therapies. However, clarifying the details is difficult, and we need to prospectively reveal the association of readmission of HF because of lack of compliance with prescribed drug treatment with social background in this cohort in the future.

The number of underlying diseases has been thought to increase with age. However, our study showed that the super-elderly group was less likely to have comorbidities, for 3 reasons. First, the super-elderly patients were less likely to have acute myocardial infarction or low left ventricular function as the etiology of HF (**Figure 1**). Coronary artery disease was based on coronary risk factors.[22] The super-elderly group was more likely to have the etiologies of valvular heart disease and infection in this study, etiologies that are less affected by coronary risk factors. Second, patients with cardiomyopathy appear to have low life expectancy.[23] Third, the super-elderly group might not have undergone invasive examinations such as coronary angiography or myocardial biopsy. A Swedish study reported that patients >90 years old with HF had less comorbidities.[24] Thus, our results that the super-elderly patients had fewer underlying comorbidities might be partially explained by the aforementioned reasons.

Perspective

Our registry is very helpful for primary care physicians and co-medical staff in general practice in their management of HF in elderly patients. In addition, in our registry, 67.8% of patients in the super-elderly group had LVEF ≥50%. The American Heart Association guidelines suggest that HF with preserved EF (HFpEF) accounts for up to 50% of HF cases in the community and is predominantly a disorder of older women with hypertension.[25] Our data are expected to be helpful for predicting the relevant outcomes of older adults with HFpEF.

Furthermore, our study reports detailed social information for patients with HF. The ATTEND registry mainly showed detailed admission data[5] and JCARE-CARD showed detailed data at discharge and the outcomes of patients with HF in all areas of Japan.[4] However, the KICKOFF Registry mainly shows detailed social data in patients with HF in community-based hospitals. Increasing life expectancy in Japan has resulted in a huge population of elderly patients with HF.[26] Therefore, social background, social supports, and physical activity must be focused on. In future studies, we can address the long-term outcome of all causes of death and readmission associated with social background, including performance of ADL or social frailty.

Study Limitations

This registry has several limitations. First, the diagnosis and etiology of HF were physician-defined; therefore, a selection or referral bias might be an inevitable limitation of this study. Second, the participating hospitals were only small- and medium-sized hospitals; there were no university or tertiary emergency hospitals, and the number of patients with HF was relatively small. However, the aim of our registry was to provide a snapshot of the social background of Japanese patients with HF in community-based general hospitals, and because it was a community-based study, we could obtain detailed data about the patients' social backgrounds. We believe our results showing the clinical characteristics provide an insight into the social background of patients with HF and will become the basis of further research. Third, data on social background were collected via interview survey; therefore, the data were not evaluated by strict criteria. For example, the diagnosis of dementia was defined as having been previously diagnosed by a physician or the patient having impaired short-term memory. We could not administer cognitive function tests for any of the patients with HF; however, the diagnosis of short-term memory impairment was based on the judgment of the patient's long-term primary care doctor, which we believe is a reasonable method of diagnosis. Fourth, we only evaluated ADL by the patient's ability to walk. We did not have data on detailed evaluation of ADL, such as the Barthel Index[27] or function independence measure.[28] However, independent walking is one of the most important and principal abilities affecting physical frailty in patients with HF.[29] Thus, although this registry has some limitations, it has revealed the proportions of patients with HF in communities in Japan who are living alone, the level of family support they receive, and several other social and living condition factors. The KICKOFF Registry highlights the value of social background information in the treatment of patients with HF, especially the super-elderly. We believe that the KICKOFF Registry provides unique and useful data despite its limitations.

Conclusions

The KICKOFF Registry, a prospective community-based multicenter cohort in Kitakawachi and Yawata, Japan, provides unique and detailed social background information on Japanese patients with HF. Super-elderly patients with HF are at a serious risk of social frailty; those living alone or with only a partner are in need of support by other people and hospitalization results in a decline in their ability to perform ADL.

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Appendix

The following is a list of institutions participating in the registry.
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Vice-Chief Investigator: Takabayashi K, Nohara R (Hirakata Kohsai Hospital).
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